



HIRI NEWS



The Great European Heat Wave of 2003, Sacramento Municipal Utility District's Heat Island Reduction Activities, Supplemental Environmental Projects, and More!

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European Heat Wave

Larry described last summer's heat wave in Europe as its worst ever. In western Europe – and France in particular – mortality reached massive proportions and prompted a breakdown in some of the world's top health systems.

The results of Larry's analysis, which he completed for the HIRI call, focused on four key findings:

- The heat wave was much more severe in western Europe than in countries to the east
- Deviations were generally higher for maximum, rather than minimum, temperatures
- Of major European cities, Paris exhibited the greatest deviations (up to +30 degrees F). Rome, however, exhibited more continuous anomalous conditions
- A heat wave of similar magnitude in the eastern U.S. would be, by far, the worst experienced in recorded history (Larry is interested in developing a comparative extreme temperature scenario for the U.S.)

From HIRI-sponsored work at the University of Delaware and Johns Hopkins University's School of Public Health, we know that anomalous heat spikes can lead to above-average mortality levels, particularly in areas unaccustomed to hot weather. In August 2003, this is exactly what happened in Paris and other western European cities.

Preliminary mortality figures from France alone indicate that 11,435 died in the heat wave. The City of Paris has yet to compile a final death toll from the heat wave, where record-high temperatures reached 104 degrees F. News accounts suggest that the country is far from fully understanding why so many died, but early assessments point to several

factors: a rapidly aging society, a health care system short on care for the elderly, and low awareness of heat health hazards.

Eric Klinenberg, in his book, "Heat Wave: A Social Autopsy of Disaster in Chicago" states that such circumstances can go unnoticed for long periods of time until a crisis strikes. He recently told a news agency that, "Heat waves are important precisely because they help us understand everyday conditions that always affect the society but are difficult to see."

The elderly are especially vulnerable in a heat wave because they are physically susceptible to heat-related illnesses, and may take medicines which make them even more sensitive to rising temperatures. Those problems are compounded because elderly people in Paris (and in U.S. cities) are often isolated in small apartments with few friends or relatives to look after them. According to France's National Institute for Statistics and Economic Studies, the percentage of citizens 60 or older is expected to rise from 20.6 percent in 2000 to 35 percent in 2050.

In his presentation, Larry showed a series of analytical graphs to contrast normal temperatures and conditions in western Europe with those experienced during the heat wave. He demonstrated that the frequency of days above 95 and 100 degrees F was unprecedented in France's history (the average summertime temperature in Paris ranges between 50-76 degrees F).

Larry's actual v. normal minimum temperature analysis provides particularly important insight into the root-cause of the tragedy. Actual minimum temperatures were up to 20 degrees F above normal throughout the June-August interval, with the exception of a brief period

in July. Because many western Europeans do not have air-conditioning, extreme nighttime temperatures meant relief was not available.

Larry concluded by suggesting that the consequences of an analogous heat event in Washington D.C. – or other major U.S. city – could produce similarly devastating results.

SMUD's UHI Programs

Dr.Misha Sarkovich, of the Sacramento Municipal Utility District (SMUD) joined the call to discuss the utility's well-established urban heat island related (UHI) initiatives. The SMUD strategy emphasizes both shade tree planting and increasing roof albedo, and achieves these goals through their SacShade (initiated 1990) and Cool Roofs (initiated 2001) programs. SMUD has also made progress on increasing the penetration of cool paving materials, with an emphasis on parking lots.

Misha said there are several reasons for the Utility District's long-term commitment to cool communities and UHI mitigation. Primarily, SMUD views its programs an opportunity to reduce peak electricity demand and air conditioning energy load during the summer months.

Another objective, viewed from a long-term perspective, is UHI mitigation. SMUD believes heat island reduction strategies can reduce ambient temperature 1 to 2 degrees F thereby indirectly lowering air conditioning requirements. An additional and long-term goal is market transformation. Other benefits of the Shade Tree and Cool Roof Programs are improvements in the region's air quality, enhancing local aesthetics, and promoting a sense

of community spirit and cooperation.

The Shade Tree Program started in 1990 as a collaboration with the non-profit, community-based organization, Sacramento Tree Foundation, acting as a contractor.

SMUD provides free 5-gallon deciduous trees (maximum 10 per household), ties, stakes, fertilizers and expert advice on tree planting and care. The Program is funded entirely by SMUD, which has served over 120,000 customers and planted more than 350,000 trees. An annual budget over \$1.5 million means that since 1990, over \$20 million has been invested.

The Program's incentive for purchasing a cool roof is \$0.10 per square foot (decreased from \$0.20 in 2002 and 2001) paid to the contractors, who then pass the benefit to building owners. The Program thus has the effect of lowering total project cost for the consumer.

Next, Misha discussed eligibility for the cool roof incentive. He said participating buildings must be either commercial or multi-family, and must have a flat roof. SMUD also stipulates that contractors install only cool roof products that meet or exceed EPA's Energy Star specifications.

With respect to program administration, Misha says funding after 1996 comes primarily from public goods mandates. For example, in 2001, SMUD received a grant from the California Energy Commission for \$2,000,000 to fund cool roof incentives. SMUD used the CEC funding to leverage its funding for the rebates (15 cents from CEC and 5 cents from SMUD).

Both cool communities offerings deliver impressive results. The Shade Tree Program's average energy cooling load savings is 153 kWh/year per mature tree, while average demand savings is 0.056 kW per mature tree. On the cool roofs side, average energy cooling load savings is 20%, average energy cooling load savings is 0.15 kWh/year/sq. ft., and average demand savings is 0.25 W/sq. ft. Misha noted that one reason for SMUD's success with cool roofs is that the program is contractor driven: contractors market the program, screen potential candidates, process the paperwork, and receive the rebate.

Other lessons learned from both programs are that:

- Cool roofs and shade trees are cost-effective and highly valued by utility customers
- Continuous refinement of program design and operation has proven effective
- A long-term commitment to UHI efforts by the SMUD Board and Management has been crucial
- The involvement of local trade allies (roofing contractors, urban forestry organizations) has paid off

SMUD intends to continue both award-winning programs in 2003.

For more information, see:
<http://www.smud.org/residential/saving/trees/index.html>

and:

<http://www.smud.org/commercial/saving/service/roof.html>

Supplemental Environmental Projects

Hyatt Nolan, of EPA's Office of Policy and Innovation, joined the call to discuss Supplemental Environmental Projects, or SEPs, as well as EPA's new "SEP Toolkit" for renewable energy (RE) and energy efficiency (EE).

She informed the group that SEPs are environmentally beneficial projects that improve, protect, or reduce risks to public health and the environment. SEPs can include a wide range of environmental projects, including energy efficiency, renewable energy, and heat island reduction.

EPA's new Toolkit is aimed most immediately at government officials, but will be a valuable resource for other interested and affected parties. These include state and local air and energy officials, EPA Regional and Headquarters compliance offices, EPA program and policy staff, DOE program offices and DOE's National Renewable Laboratory, universities, environmental foundations, the regulated community, and, of course, the affected neighborhoods

The goal of the Toolkit is to educate policymakers and impacted parties about the environmental and economic benefits of SEPs. Hyatt indicated this could help funnel compliance dollars into projects that maximize the environmental benefit of enforcement actions.

In a nutshell, EPA's Toolkit will provide practical guidance, project examples and ideas, sample documents, peer contact information, references to model policies, and related information. Hyatt believes the Toolkit will also foster a peer exchange network to share technical information and to

answer regional, state, and local regulators' requests for help.

On-the-ground examples of SEPs that increase vegetation include urban airshed reforestation and roof gardens. In one recent case, a New Jersey utility paid \$1 million to plant neighborhood trees.

Realworld examples of EE SEPs include investments in sustainable, or "green" buildings such as hospitals and schools, as well as lighting change-outs. In Colorado, as the result of a 1999 settlement, a manufacturing firm performed an EE assessment at one of its facilities, and subsequently installed motion light detectors and energy efficient lights.

An example of a RE Wind Power SEP is a 5-year wind power purchase in Colorado paid for by a manufacturing firm. Another is solar power (photovoltaic) installation for \$75,000 in the State of Maryland. In this case, a utility installed small PV systems on three public buildings, including two schools and an environmental center (a 2002 settlement).

Hyatt said that in all cases, SEPs are undertaken as part of an enforcement action, but stressed they are strictly voluntarily on the part of the violator. (However, the regulator typically determines the scope of the project). Other take-away points are that SEP projects may not be underway before a regulator has identified the violation, and that SEPs are usually implemented in addition to a penalty, which is mitigated on the basis of project costs and local guidelines.

For more information, see:
<http://cfpub.epa.gov/compliance/re-sources/policies/civil/seps/>

Additional News

Joyce Rosenthal of Columbia University talked briefly about the American Geophysical Union (AGU) Conference, which was held in San Francisco December 8-12, 2003. Several papers and posters covered heat island related topics. Joyce presented a poster, "One hundred years of New York City's Urban Heat Island: Temperature Trends and Public Health Impacts", which can be found under the Program Selection, U01: Health, Air Pollution, and Climate.

Dr. Bob Bornstein also presented his research, which focused on how urban heat islands impact precipitation. And Dr. Marshall Shepherd and Dr. Menglin Jin led sessions on "Human-Induced Climate Variations Linked to Urbanization: From Observations to Modeling". Information on the conference including abstracts can be found at:
<http://www.agu.org/meetings/fm03/fm03gplan.shtml>

Next, Eva Wong of the HIRI Program informed call participants that EPA and NASA air quality modelers and researchers met in North Carolina on December 16, 2003 to exchange information on heat island modeling efforts in Atlanta and Houston, and also to discuss assimilating satellite data into air quality models. Issues such as using remote sensing products for land-use classifications, using satellite data in Regional-scale models to improve the physical atmosphere, and assimilation strategies in CMAQ were discussed.

NASA plans to have additional results on their work in Atlanta out in the next few months. All agreed that a broader meeting – in terms of scope and participation – should be held in the Spring or Summer of 2004.

David Hitchcock of the Houston Advanced Research Center briefly mentioned that Bill White, a supporter of heat island reduction activities, has been elected Mayor of Houston. White will appear in an upcoming 's Wedge Group offices for a docu-news television piece describing how the city can lower its ambient temperature two degrees F through modest changes in building practices and tree planting. Previously, White's "Wedge Group" was involved in financing research in this area.

The next conference call is TBD. Stay tuned for the date, call-in number, and access code.
